[0012]

[Means for Solving the Problems]

The above described object can be attained by using the following semiconductors:

(1) a semiconductor device characterized in that a layer having a charge trapping level is formed in a part below the wiring or at least a part of the periphery out of the interface between a high resistance Si substrate and a surface insulating film;

(2) a semiconductor device characterized in that a Si layer having the charge trapping level whose density is at least 1E16 cm-3 is inserted in a part below the wiring or at least a part of the periphery out of the interface between a high resistance Si substrate and a surface insulating film;

(3) a semiconductor device characterized in that the Si layer having the charge trapping level according to (1) above is a polycrystalline Si film or an amorphous Si film;

(4) a semiconductor device characterized in that the Si layer having the charge trapping level according to (1) above is an impurity containing layer formed by implanting ions into the Si substrate;

(5) a semiconductor device characterized in that at least a part below the wiring and a part of the periphery out of the interface between a high resistance Si substrate and a surface insulating

film is divided into small areas by a groove into which an insulator or dielectric is embedded;

(6) a semiconductor device characterized in that at least a part below the wiring and a part of the periphery out of the Si layer having the charge trapping level according to (1) to (4) above is divided into the small areas by the groove into which the insulator or the dielectric is embedded;

(7) a semiconductor device according to (1) to (4) above, characterized in that the Si substrate is a SOI (Silicon On Insulator) type, and at least a part below the wiring and a part of the periphery out of the SOI layer is removed by etching to be replaced with a Si layer having charge trapping level whose density is at least 1E16 cm-3;

(8) a semiconductor device according to (5) and (6) above, characterized in that the Si substrate is a SOI type, and at least a part below the wiring and a part of the periphery out of the SOI layer is divided into the small areas by the groove into which the insulator or the dielectric is embedded;

(9) a semiconductor device according to (8) above, characterized in that at least a part below the wiring and a part of the periphery out of the SOI layer, which is divided into the small areas by the groove into which the insulator or the dielectric is embedded, is replaced with a polycrystalline Si layer; and

(10) a semiconductor device according to (8) above, characterized in that at least a part below the wiring and a part of the periphery

out of the SOI layer, which is divided into the small areas by the groove into which the insulator or the dielectric is embedded, is replaced with the insulator.

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[Function]

In the case that the Si layer having the charge trapping level, whose density is at least the charge density that is induced on a Si layer surface by direct current bias of the wiring, is inserted into a sufficient area out of the interface between the high resistance Si substrate and the surface insulating film in the vicinity of the wiring, most of the electric charge that is induced on a Si layer surface by direct current bias of the wiring is trapped by the charge trapping level, so that the electric charge cannot move any more. In other words, since a Fermi level is clamped due to the charge trapping level existing in a forbidden band, an inversion layer is not generated, and thus the mobile charge is not generated. Accordingly, the above described problem such that the substrate resistance is substantially lowered due to the generation of the inversion layer will not occur. Particularly, when the density of the electric charge that is induced on the Si surface by the direct current bias of the wiring becomes at least 1E16 cm-3 on the Si surface, the loss of the high frequency electric power as described in the above problems becomes remarkable. As a result, this function will be effectively recognized from at the point

when the density of the charge trapping level becomes 1E16 cm-3. In addition, "1E16" represents the sixteenth power of 1 × 10, and "cm-3" represents a unit of the third power of cm over 1.